Pollutant Loading Classifications

June 2003

Background on determining pollutant loading classifications

During the public comment period on the first draft Stormwater Management Manual for Eastern Washington, several commenters suggested using average daily traffic (ADT) counts in classifying pollutant loadings. During the course of several meetings, the Manual Subcommittee agreed to pursue such an approach and also to use it to identify treatment requirements.

What are the classifications and how are they applied?

- Insignificant pollutant loading: impervious surfaces not subject to traffic, sand or anti-icing compounds; un-maintained open space. No treatment is required for these land uses.
- Low pollutant loading: low ADT traffic areas, including most residential parking and employee-only parking areas; most public parks; other land uses with similar traffic/use characteristics. Basic treatment is required for discharges to surface water from these land uses. No pre-treatment is required for discharges to groundwater if the vadose zone below a drywell has some capacity to remove pollutants.
- Medium pollutant loading: medium ADT traffic areas, including visitor parking areas for commercial buildings with a limited number of daily customers; intersections controlled by traffic signals; roofs subject to pollutant removal ventilation systems; other land uses with similar traffic/use characteristics. Treatment to remove metals is required for new discharges to non-exempt surface waters. Basic treatment is required for redevelopment projects with discharges to surface waters. Pre-treatment requirements for discharges to drywells depend on the pollutant removal capacity of the vadose zone.
- High pollutant loading: high ADT traffic areas, including parking areas with a frequent turnover of visitors (grocery stores, shopping malls, restaurants, drive-through services, etc.); on-street parking areas of municipal streets in commercial areas; other land uses with similar traffic/use characteristics. Additional treatment to remove oil is required for new discharges to surface waters and drywells. Treatment to remove metals is required for redevelopment projects with discharges to non-exempt surface waters. Additional pre-treatment requirements for discharges to drywells depend on the pollutant removal capacity of the vadose zone.

How were the classifications determined?

Threshold between **medium** and **high** pollutant loading: The existing delineations for roads (30,000 ADT), parking areas (100 trip ends per 1000 SF building area), and other high-use sites which trigger the requirement for oil control are based on previously reviewed existing data and are already in use.

The Manual Subcommittee intended to identify a scientific basis for establishing the ADT thresholds to delineate **low** and **medium** pollutant loadings. One purpose of identifying this threshold was to exempt projects that could be classified as low pollutant loadings from added treatment requirements (in the first draft manual, metals treatment was required for *all* commercial and industrial sites, multi-family projects, arterials and highways).

Threshold between **low** and **medium** pollutant loading: Further review of the available literature indicated that there is not a scientific basis for a definitive threshold as was hoped there would be. Pollutant concentrations in road runoff are highly variable and dependent on the surrounding environment, not just ADT. In the absence of definitive data, a practical presumptive approach was proposed. The subcommittee agreed that it makes sense to provide water quality treatment for higher volume roadways, but we recognized that it would not be appropriate to apply the same ADT threshold for freeways, urban roads, and parking areas since pollutant loading is different in areas where cars travel freely versus where they frequently apply their brakes and turn off their engines.

- For roads, the 7,500 and 15,000 vehicle thresholds for medium ADT urban roads and freeways, respectively, were determined following an analysis of local traffic patterns and a WSDOT study of an 18,000 ADT roadway.
- For parking areas, the trip end counts are based on an analysis of the Institute of Transportation's "Trip Generation" estimates for various land uses. The threshold of 40 trip ends per 1,000 SF building area for medium ADT, and both the alternative 100 and 300 total daily trip end counts for medium and high ADTs, were based on the best professional judgment of traffic engineers on the Manual Subcommittee.

Basic rationale behind the threshold determinations

For roads: Urban streets usually begin as two-lane roads with numerous intersections. On a two-lane street with about 5,000 ADT, traffic is barely noticeable except during the peak traffic hour. As ADT approaches 10,000 on a two-lane road, the streets function differently and typically require signals to control traffic at major intersections. When lanes are added to these streets based on increased traffic demand, ADT may have increased above 15,000 to 20,000 vehicles per day.

Roughly 80% to 90% of the traffic volume in an urbanized area of eastern Washington may be associated with streets with 7,500 ADT or higher, excluding high speed highways. Therefore an ADT of 7,500 was agreed upon as an appropriate threshold for "medium pollutant loading" roadway redevelopment projects in order to presumptively treat the majority of roadway runoff pollution in an urban setting. Since rural roads with volumes in excess of 7,500 are typically located close to urban areas, the same threshold should apply.

For freeways, the ADT threshold should be somewhat higher, but how much higher? The only data point available for subcommittee consideration was a WSDOT study of an 18,000 ADT highway during which water quality criteria for metals was commonly exceeded in storm runoff.

For parking areas: The average number of trip ends estimated using the Institute of Transportation Engineers "Trip Generation" is commonly used in determining traffic and parking requirements. Traffic volumes may be based on the number of hotel rooms, dwelling units, employees, etc. Using building square footage is another way of determining traffic volumes for many land use categories.

To determine an appropriate number of vehicle trip ends for the threshold between low and medium pollutant loadings for parking areas, the subcommittee looked at examples of uses that might be considered to produce more than low, but less than high pollutant loadings: a hospital at 20 trip ends per 1000 SF; a library at 40; a dental facility at 40; a hardware store at 50 trip ends. Based on these uses, 40 trip ends per 1000 SF was proposed as a reasonable threshold.

In addition to a figure based on building area, a total trip end figure independent of building size was proposed. Any facility with more than 100 trip ends could be classified as a moderate use and any facility with 300 or more trip ends would be classified as high use. These figures are based on professional experience and considering examples of where a minimum value helps meet the intent of determining pollutant loading classifications.